

be utilised in unravelling the genetic connection of human races; it was only incidentally, when I became aware of the extraordinary degree of individual variation, that I was drawn into the investigation of features which have been described as "marks of degeneration." The result of my inquiries in this direction has been to show that only two out of the seven features of the external ear which I investigated are correlated with a mental bias towards crime or insanity, viz. a retrograde development of the helix and a persistence of the ear tip.

My results are the more valuable because I was at first sceptical of the very definite results obtained by continental observers on the insane and criminal classes. It appeared very probable that the definiteness of their conclusions would disappear if allowances were made for the populations from which the criminals and insane were drawn and for the influence of race, sex and colour. After making those allowances, however, there remain a certain number of characters peculiar to these classes, of which those I have cited in the ear are only examples. But, unfortunately for any practical application of Lombroso's doctrine to the detection of the socially unfit, the physical differences between the sane and the insane or criminal classes are those of degree or ratio, not of kind. The characters may assist in the detection of the class, but not of the individual.

All that can be deduced from the present investigation is that a slightly greater proportion of the people who have ear tips and retrograde helices give themselves over to crime than those in which these two features are absent. The evidence is just sufficient to justify the suspicion that a small proportion of criminals are criminals because of their physical constitution, and it is certainly the duty of every anatomist to discover how such individuals may be recognised. As yet all the criminal marks we know of can only be stated in relative terms of the class, and have, unfortunately, no application to the individual.

ARTHUR KEITH.

SCHOOL BOARD EXHIBITION OF SCIENTIFIC APPARATUS.

ONE of the reasons often given as an excuse for not introducing instruction in the elementary principles of science into the curriculum of elementary schools is the expense involved in providing the necessary apparatus for experimental demonstrations. It is common to find that school managers have very exaggerated ideas as to the amount of really necessary equipment. Though it has been the custom for some years, at institutions like the Royal College of Science, to instruct the students in training to become science teachers how effective apparatus can be made at a very small cost and with a minimum of mechanical dexterity, the great majority of science teachers, notably those of elementary schools, have had few opportunities of acquainting themselves with the use that may be made of the odds and ends of domestic life to construct instruments which can be effectively used in simple work in experimental science.

The School Board for London has recently taken steps to remedy this defect in the training of its teachers. Influenced by the heavy expenditure on apparatus to which it has been put, and convinced that the construction of simple instruments can be made a valuable assistance in teaching science, the Board has for some months encouraged its teachers to make apparatus themselves and to give their pupils opportunities of making models to illustrate the principles of the lessons they have received. The exhibition at the Examination Hall on the Embankment (see NATURE, p. 656) represents the results of these efforts up to the present time. Though satisfactory if considered as the first exhibition and as showing that an earnest attempt is being made to give science its proper place in training children for the business of life, there are some directions in which improvement is easily possible. It must be understood that in pointing these out we do not lose sight of the difficulties the organising committee has had to overcome, but desire simply to suggest what may be done to ensure a better set of exhibits next year.

In the present exhibition the work of teachers, adult students in evening classes and children in day schools are indiscriminately mixed up. The work of comparison is consequently very difficult, and it is to be feared that the boys and girls will be a little disheartened to find their work side by side with that of their instructors and their big brothers in the continuation

school. Nor is it easy to form an idea of the work of the pupils of different schools. It is only after consulting a catalogue, or reading a label affixed to the exhibit, that the visitor is able to find the school from which the maker of the apparatus comes. It would be better in the future to have together typical sets of apparatus from different schools.

It is difficult to estimate the relative importance given to different branches of science by the Board. There is a large number of exhibits in static electricity, but only two pieces of apparatus shown in connection with the study of light and three to illustrate the teaching of physiography. The subjects of heat and voltaic electricity are, judging from the number of exhibits, popular, while acoustics meets with very scant recognition. It is disappointing, too, to find so little attention given to Nature-knowledge. From the conditions of city life it is hard for children to get even a nodding acquaintance with the beauties of organic life, whether animal or vegetable, and the school should be able to help the youngsters to learn something of the joys of country life. So much has been accomplished in recent years in the direction of providing simple school museums of common botanical and zoological objects, that it is to be hoped the teachers and scholars will be encouraged to do something in this direction. Then, why is nothing done to familiarise the children with the "starry heavens"? We looked in vain for a simple home-made telescope. Yet teachers have been shown for many years past in the astrophysical laboratory at South Kensington how a really effective instrument can be made with cardboard tubes at a trifling expenditure.

But a good beginning has been made. If more attention is in the future given to some of the subjects we have indicated, and if the work of teachers is separated from that of the taught, the utility of the exhibition will be much enhanced.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—An election to the Isaac Newton Studentship in Physical Astronomy and Optics will be held next term. Candidates must be Bachelors of Arts under twenty-five on the first day of 1902. The studentship is of the value of 200*l.*, tenable for three years. Applications are to be sent to the vice-chancellor between January 16 and 26.

On November 4, Mr. R. P. Paranjpye, the Indian student who was bracketed senior wrangler in 1899, was elected to a fellowship at St. John's College.

PROF. WILLIAM RAMSAY, F.R.S., commenced a course of twelve lectures on "The Recent Developments of Chemical Theory" at University College, London, on Friday last. This course is especially designed for those who have a previous acquaintance with inorganic and organic chemistry and who may wish to know the present standpoint of chemical thought.

At the annual meeting of the governors of Dundee University College last week Mr. John Morley referred to the signs of increasing interest in universities and the increasing force which must be given to the movement in order to put ourselves in the position of other progressive nations. He hoped that the movement had not yet attained full flood, because "all those who inquired into the conditions of scientific training in Germany and the United States were really—he was not using an excessive word—dismayed when they found the comparative shabbiness and meagreness of the buildings, funds and equipments in this island. There was no form of care for the public weal more distinctly certain of being reproductive than that care which placed within the reach of the coming generation opportunities for making the best of itself and giving to the Commonwealth the best of its faculties. That was now a commonplace. The immediate question was, what was to be done in order to raise Dundee and other places in Scotland up to the level which public necessities—national necessities—Imperial necessities if they liked—demanded?" The answer is—and it will serve for practically all institutions for higher education in the British Isles—Increase the teaching resources by building and equipping laboratories, encourage original work rather than the multiplication of successes in examinations, create in the public mind a spirit of sympathy with scientific work, and inspire the Government to action before it is too late.

A SCHEME for the extension and better equipment of the University of Glasgow, especially in the departments of

medical and physical science, was approved at an influential meeting of members and friends of the University held in the Glasgow City Chambers last week. Addressing the meeting, Principal Story said that in the beginning of the present year an executive committee was formed to provide funds for carrying out the measures of extension and reform considered of primary importance, and already they had received a sum of more than 62,000*l.*, including 10,000*l.* given for a special lectureship. It was proposed to make good the defects by the erection of additional premises for the class rooms, departmental museums, and laboratories of physiology, materia medica and forensic medicine, and public health. The needs of the chemical department, which could be regarded as belonging both to the faculty of science and to that of medicine, might be met, but only partially and temporarily, by the transference of premises available when physiology was provided for. A set of thoroughly furnished chemical laboratories is one of the most immediate wants, and additional accommodation is needed by the department of physical science. The full realisation of these designs must necessarily be a work of time, and will cost in all probably not far short of 100,000*l.* But it is encouraging to know that within the last few months more than the half of this sum has been subscribed. For the other half the University must depend upon the generosity of its many friends.

SCIENTIFIC SERIALS.

American Journal of Science, October.—On galvanometers of high sensibility, by C. E. Mendenhall and C. W. Waidner. A description of the design and manufacture of a delicate galvanometer of the four-coil Thomson type. There is a detailed discussion of the methods for obtaining the highest sensibility and also of the causes of the changes of zero.—On a method of locating nodes and loops of sound in the open air, with applications, by Bergen Davis. A small mill-like arrangement, constructed by placing four hollow cylinders of gelatine at the end of cardboard arms in such a manner that the closed ends pointed in the same angular direction, was mounted in the mouth of a resonator with the plane of the system perpendicular to the mouth. The resonator was in unison with an organ pipe, and when the pipe was blown the mill was found to rotate with a high velocity, the position of the nodes and loops being readily determined with considerable accuracy. In the open air the effect could be observed up to about sixty feet from the pipe.—The anatomy of the fruit of *Cocos Nucifera*, by A. L. Winton.—Studies of Eocene mammalia in the Marsh collection, Peabody Museum, by J. L. Wortman.—A new crinoid from the Hamilton of Charlestown, Indiana, by E. Wood.—On the estimation of caesium and rubidium as the acid sulphates, and of potassium and sodium as the pyrosulphates, by P. E. Browning.—Time values of provincial carboniferous terranes, by C. E. Keyes.—The spectra of hydrogen and some of its compounds, by John Trowbridge. The vacuum tubes used in the experiments described were illuminated by a current derived from a large battery of storage cells and not from a Ruhmkorff coil. The conclusions drawn from these investigations, which are at variance with the views generally received, are that hydrogen is an insulator, the passage of electricity through hydrogen, oxygen, nitrogen and their gaseous compounds being conditioned by the water vapour present. Certain carbon bands are always present in glass tubes filled with hydrogen, nitrogen, oxygen and ammonia gas, notwithstanding the greatest care taken during filling. The X-rays excited by the application of a steady current are due to the radiations set up by the dissociation of highly rarefied water vapour.

Bulletin of the American Mathematical Society, October.—Prof. F. N. Cole gives an account of the proceedings at the eighth summer meeting of the Society, held at Cornell University, Ithaca, New York, August 19–24. It was a largely attended meeting, and various circumstances made an adequate provision of time for the reading and discussion of the thirty-two papers presented practically impossible. The titles and abstracts occupy more than twenty pages. The third colloquium of the same Society was also held on the same date. Dr. Kasner gives an abstract of the proceedings at the two previous colloquia, as well as of this one. During the four days, two courses of four lectures each were delivered by Prof. Oskar Bolza, on the simplest type of problems in the calculus of variations, and by Prof. E. W. Brown, on modern methods of

treating dynamical problems, and in particular the problem of three bodies. Grateful acknowledgments were made of the hospitality of the University and for the numerous privileges which were afforded to the members present. Short notices are given of two of the papers: upon the non-isomorphism of two simple groups of order $8\frac{1}{2}$, by Miss Schottenfels, and concerning surfaces whose first and second fundamental forms are the second and first fundamental forms respectively of another surface, by Prof. A. Pell. Extensive notes of the mathematical courses for the session 1901–1902 at several Universities follow, with other matters of personal interest. Several pages are also devoted to new publications.

SOCIETIES AND ACADEMIES.

LONDON.

Entomological Society, October 2.—The Rev. Canon W. W. Fowler, president, in the chair.—Mr. G. C. Champion exhibited a long series of *Buprestis sanguinea*, Fabr., from Albarracin, Spain, showing the remarkable dimorphism of this species.—Mr. H. St. J. Donisthorpe exhibited on behalf of the Rev. H. S. Gorham, of Shirley Warren, a specimen of the scarce beetle, *Hister marginatus*. He also exhibited a number of rare Coleoptera from the New Forest, including *Velleius dilatatus*, F., from hornets' nests, *Anthaxia nitidula*, L., *Agrilus sinuatus*, Ol.—not taken for many years—*Agrilus viridis*, L., *Platydema violaceum*, F., a species also not recorded recently, and *Collydium elongatum*, F., one specimen taken in the burrows of *Melasis buprestoides* and another in the burrows of *Scolytus intricatus*. Mr. Champion said that Mr. George Lewis associated *Velleius* with *Cossus* and not with hornets.—Mr. C. P. Pickett exhibited varieties and aberrations of *Lycaena corydon* taken during August at Dover, and a series of *Angerona prunaria* (bred June and July), the results of four years' interbreeding, showing a wide range of coloration.—Prof. T. Hudson Beare exhibited a specimen of *Medon castaneus*, Grav., taken at the edge of a pond in Richmond Park.—Mr. A. Harrison exhibited a series of *Amphidasys betularia* bred from parents taken in the New Forest in 1900, including six gynandromorphous specimens.—Mr. C. J. Gahan exhibited a male specimen of *Thamnotrizon cinereus*, L., one of the long-horned grasshoppers taken by Mr. F. W. Terry at Morden, near Wimbledon, and called attention to a very interesting abnormality displayed by the specimen in possessing two pairs of auditory organs instead of a single pair, the second pair being situated on the tibiae of the middle legs in a position corresponding with that of the normal pair on the fore-legs.—Mr. F. Merrifield exhibited a series of *O. antiqua* much darker than the type, bred from pupae placed in a refrigerator five weeks and then exposed to a mean temperature of 48° F.—Mr. R. South communicated a paper by the late Mr. J. H. Leech, entitled "Lepidoptera-heterocera from China, Japan and Corea (Pyralidae)"; Mr. G. C. Champion contributed notes and observations upon the sexual dimorphism of *Buprestis sanguinea*.

October 16.—Mr. E. Saunders, vice-president, in the chair.—Mr. C. Morley exhibited for the Rev. E. N. Bloomfield leaves of hornbeam from Battle, and a photograph of leaves of sweet chestnut from Haslemere, rolled by *Atelabus circulionoides*.—Mr. R. Adkin exhibited a specimen of *Pieris deplidice* taken by him at Eastbourne on August 19 last. He said that the insect was flying strongly, and in that respect and indeed in general appearance resembled on the wing a pale female of *Colias hyale*.—Mr. C. P. Pickett exhibited series of *Melitaea cinxia* bred in June last from larvae taken in the Isle of Wight, including light and dark varieties, and a series of *Choerocampa elpenor* bred in June last from larvae taken at Broxbourne in July 1900, including a variety of the male with purplish lower wings and another with purple markings on the upper wings.—The Rev. F. D. Morice exhibited specimens of *Hedychrum rutilans*, Dhl., and *Salix propinquus*, Lep., taken at Lyndhurst by Miss Ethel Chawner, and both new to the British list. He also exhibited two monstrosities, viz. *Allantus arcuatus*; (sawfly) with two perfect wings, and two other imperfectly developed wings on the left side, and *Gorytes quinquenectus* (fossor) with the abdominal segments extraordinarily twisted out of their proper shape and places.—Mr. Arthur M. Lea communicated a list of the Australian and Tasmanian Mordellidae, with descriptions of new species; and Mr.